

Merrimack Public Information Meeting  
*October 10, 2017*

# ***MVD PFC Community Exposure Assessment Results***

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# Perfluorochemical (PFC) Background

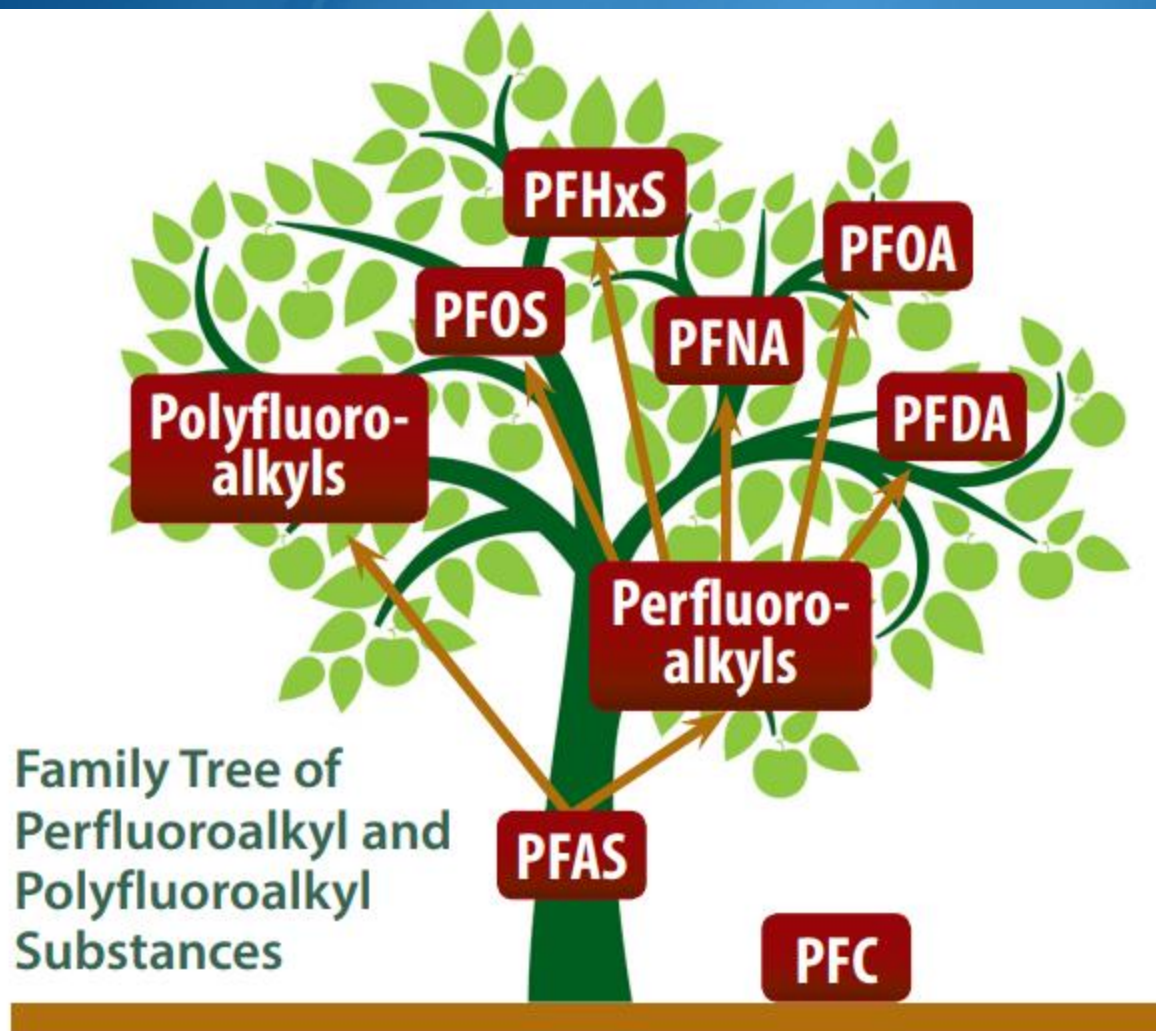


Figure 1

Agency for Toxic Substances and Disease Registry  
Division of Community Health Investigations



# Commercial and Industrial Products That Use PFCs

Commercial Products	Industrial Uses
Cookware (Teflon®, Nonstick)	Photo Imaging
Fast Food Containers	Metal Plating
Candy Wrappers	Semiconductor Coatings
Microwave Popcorn Bags	Aviation Hydraulic Fluids
Personal Care Products (Shampoo, Dental Floss)	Medical Devices
Cosmetics (Nail Polish, Eye Makeup)	Firefighting Aqueous Film-Forming Foam
Paints and Varnishes	Insect Baits
Stain Resistant Carpet	Printer and Copy Machine Parts
Stain Resistant Chemicals (Scotchgard®)	Chemically Driven Oil Production
Water Resistant Apparel (Gore-Tex®)	Textiles, Upholstery, Apparel and Carpets
Cleaning Products	Paper and Packaging
Electronics	Rubber and Plastics
Ski Wax	

# PFOA Exposure Decreasing

- Most people have been exposed to PFOA through everyday commercial products
- In 2006, PFOA manufacturers joined an EPA global stewardship program:
  - Phase out these chemicals by the end of 2015
- Exposure levels in the general U.S. population have been decreasing
- Exposure to PFOA in drinking water will lead to higher than average general U.S. exposures



# PFOA Exposure is Mainly by Oral Ingestion

- Consumption of food and water is the most important source for exposure to PFOA (includes migration of PFCs into food from boxes/packaging)
- Ingestion of contaminated dust is a significant source of exposure (carpets, upholstery, clothing)
- In infants, toddlers, and children, hand-to-mouth behavior is a significant source of exposure
- Exposure through breathing PFOA emissions is possible
- Minimal exposure through skin contact

# Long-Term Health Effects are Unclear, but Health Outcomes Being Studied Include:

- Changes to the liver enzymes levels
- Increases in total cholesterol levels
- Increases in uric acid levels, which may affect blood pressure
- Changes in sex hormone levels that could affect reproductive development and puberty
- Changes in thyroid hormone levels
- Lower immune function (lower antibody response to immunization)
- Growth and development (lower birth weight in infants, obesity in adolescents/adults, cognitive and behavioral development)
- Occurrence of some types of cancers: prostate, kidney, and testicular cancer

# C8 (PFOA) Health Project, 2005-2006

- Environmentally exposed study of 69,030 participants from West Virginia and Ohio (Ohio-River Valley)
- Exposed to PFOA from a Chemical Plant
- One of the largest and most important studies of health effects in an environmentally exposed community



# C8 Health Project Link Reports

- Health “links” were determined by three independent epidemiologists that reviewed the science (“Science Panel”)
- “Probable link” – “more likely than not that among class members a connection exists between PFOA exposure and a particular human disease.”

# C8 Science Panel Link Reports:

## No “Probable Link”:

- HTN
- Coronary Heart Disease
- Stroke
- Chronic kidney disease
- Liver disease
- Osteoarthritis
- Parkinson’s disease
- Other autoimmune diseases (other than UC)
- “Common infections” (i.e. influenza)
- Neurodevelopmental disorders, including ADHD and learning disabilities
- Asthma or COPD
- DM type 2
- Birth defects
- Miscarriage or stillbirths
- Preterm birth or low birth weight

## “Probable Link”:

- High cholesterol
- Thyroid disease
- Ulcerative colitis
- Testicular cancer
- Kidney cancer
- Pregnancy-induced hypertension

# Summary

- There is a lot of uncertainty about what PFC exposure means for a person's health
- Associations found between PFOA and various health outcomes are often not consistent between studies
- Even though some studies have found associations between PFCs and health outcomes, it does not mean that PFCs *caused* these effects
- Changes identified sometimes are not clinically (biologically) relevant
- Further study is needed and ongoing

# Merrimack Village District (MVD) Community Exposure Assessment Overview

# MVD Background Information

- In March 2016, PFOA was discovered in several southern NH communities around the Saint-Gobain Performance Plastics facility in Merrimack
- The MVD public water system is supplied by multiple individual supply wells that are blended prior to delivery of drinking water to the tap
- Two MVD supply wells (wells 4 & 5) were taken offline in June 2016 when they tested above 70 nanograms per liter (ng/L)
- MVD water supply wells are currently providing drinking water below the EPA Lifetime Health Advisory Level

# Purpose of the MVD Community Exposure Assessment

- The New Hampshire Department of Health and Human Services (DHHS) launched the Merrimack Village District (MVD) Community Exposure Assessment in Fall 2016
- The purpose was to evaluate exposure to PFCs among residents served by the MVD public water system



# Goal of the MVD Exposure Assessment

- The goal of the Community Exposure Assessment was to evaluate exposure throughout the MVD Drinking Water System by testing blood serum concentrations (“blood level”) from a random sample of the population
- Using a random sample approach allows for generalization of findings to the broader population served by the MVD system

# Details of the Exposure Assessment

- The MVD Community Exposure Assessment sought to include 200 customers
- 200 was deemed a target sample size to be representative of all MVD customers and be comparable to other populations
- A total of 217 individuals participated in the MVD Community Exposure Assessment, representing 132 households
- All participants were required to register online, complete an exposure assessment survey, and have a blood sample drawn at a participating blood draw center

# Timeline of the Exposure Assessment

- 4 Rounds of recruitment over 7 months (Oct 2016 – Apr 2017)
- Invited a total of 1,000 residents to participate
- 217 responded and completed blood draw (22% response rate)
- Final blood test results returned in August 2017
- Released results October 5<sup>th</sup>, 2017
- Community meeting to discuss results October 10, 2017

# Merrimack Village District (MVD) Community Exposure Assessment Results

# Terminology

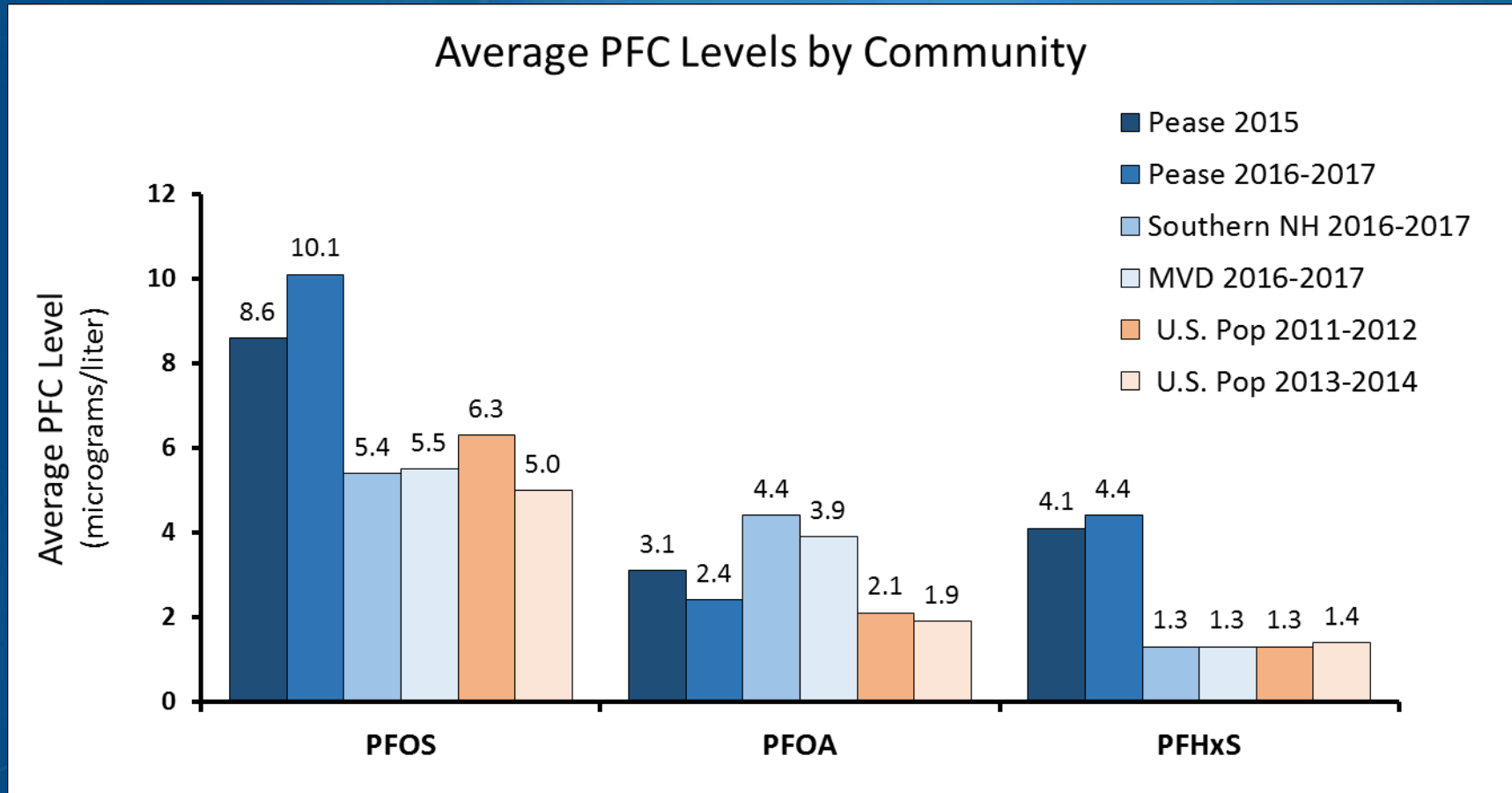
- Geometric Mean (Average): The middle level found in the community
- 5<sup>th</sup> Percentile: The lower-end of the blood levels which a minority of people tested below (5% of individuals in the community tested below this level)
- 95<sup>th</sup> Percentile: The upper-end of the blood levels which most people tested below (95% of individuals in the community tested below this level)
- Blood level concentrations are measured in micrograms per liter ( $\mu\text{g/L}$ )

# Exposure Variables Evaluated

- Overall distribution of blood test results and comparison to other communities
- Demographics: age, gender
- Length of time living at residence
- Amount of water consumed per day
- Location of residence from the Saint-Gobain plant and MVD wells #4 and #5



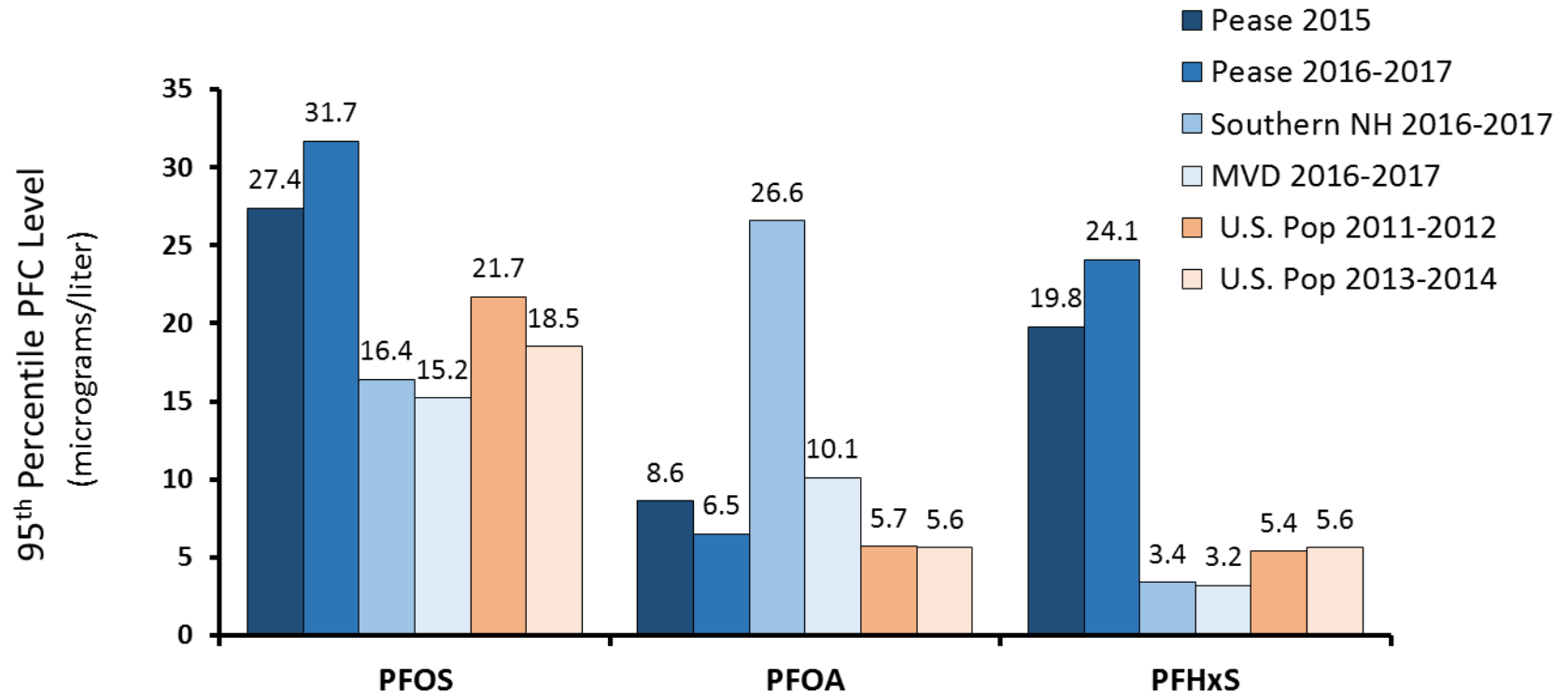
# Comparing Average PFC Levels



- Average PFOA blood levels in MVD participants are similar to blood levels in other southern NH residents whose private drinking water wells tested between 40-60 ppt of PFOA

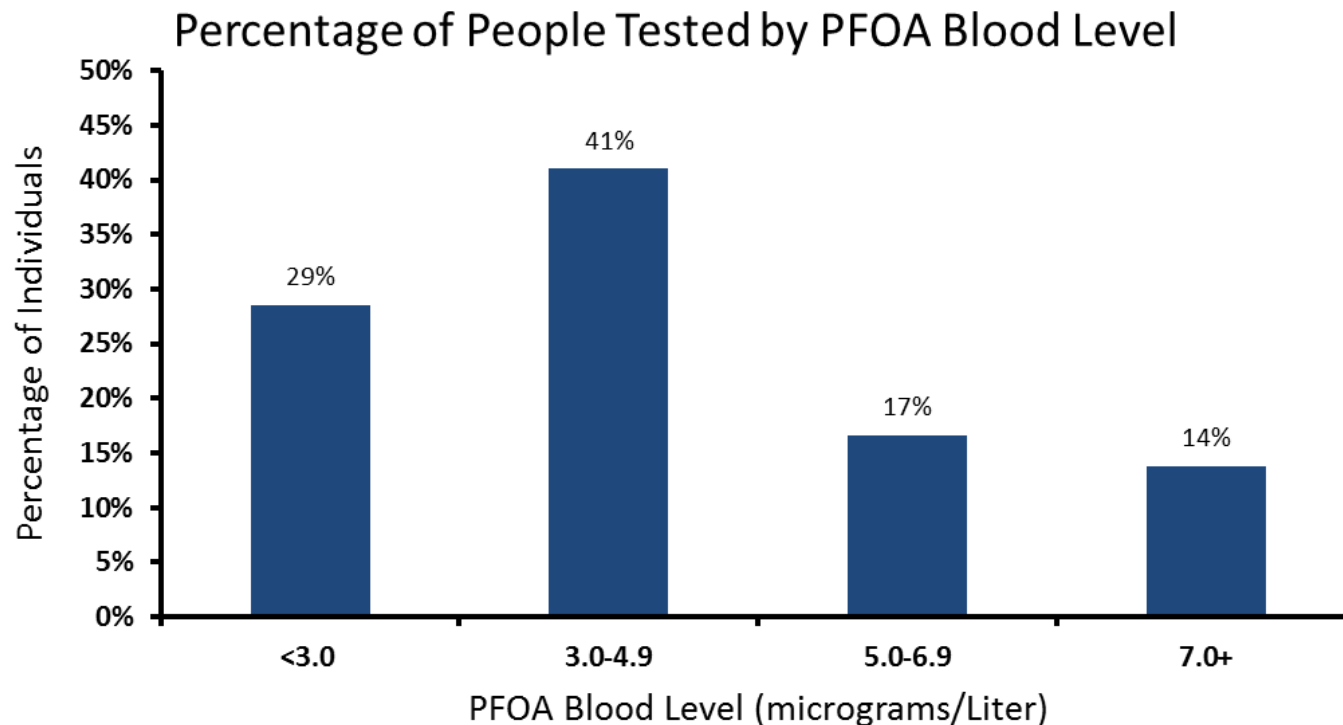
# Comparing 95<sup>th</sup> Percentile PFC Levels

95<sup>th</sup> Percentile PFC Levels by Community

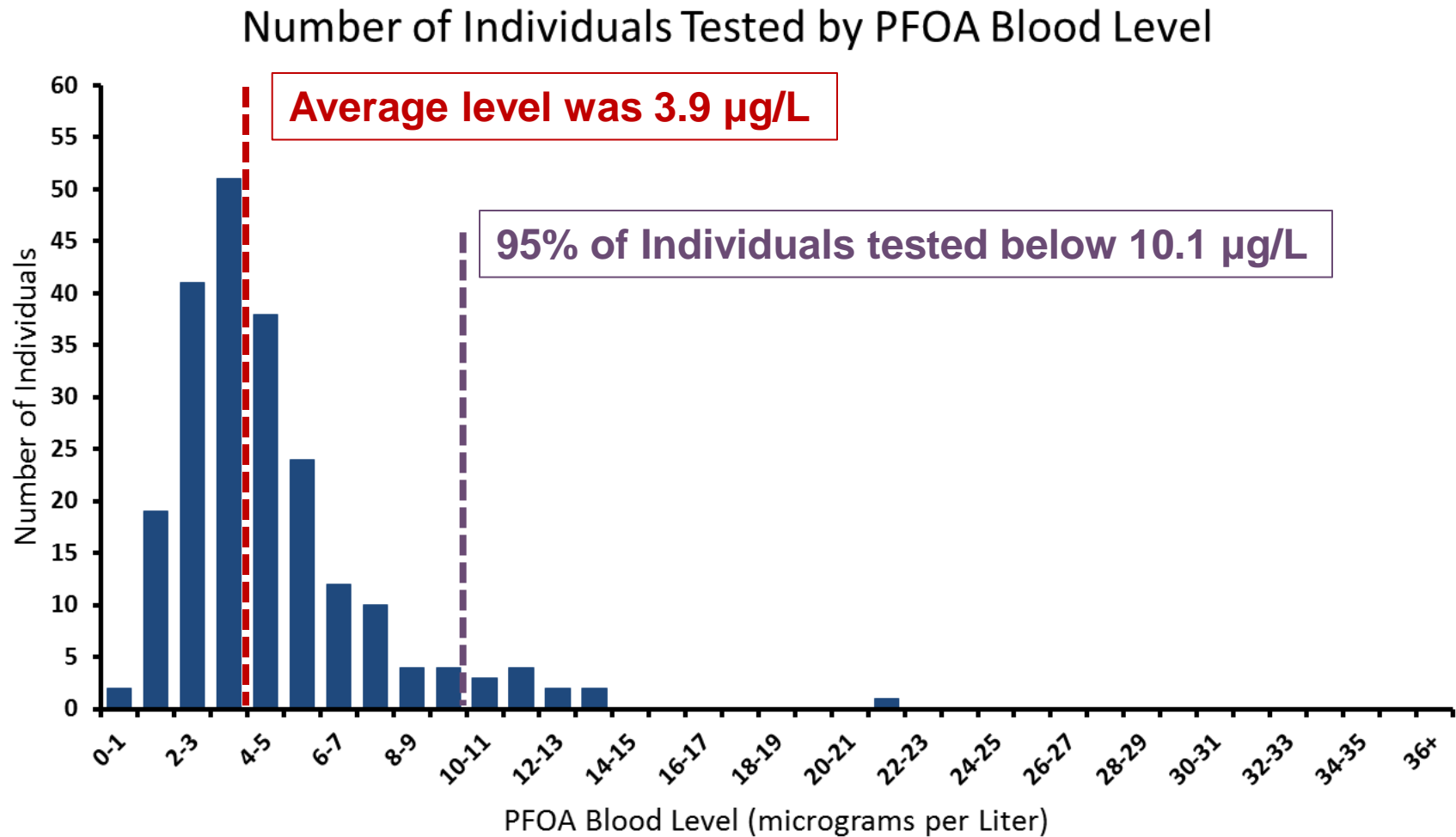


# Individuals Tested by PFOA Blood Level

Number of People (n)	PFOA Serum Concentration ( $\mu\text{g/L}$ )
62	Less than 3.0 $\mu\text{g/L}$
89	3.0 – 4.9 $\mu\text{g/L}$
36	5.0 – 6.9 $\mu\text{g/L}$
30	Greater than or equal to 7 $\mu\text{g/L}$

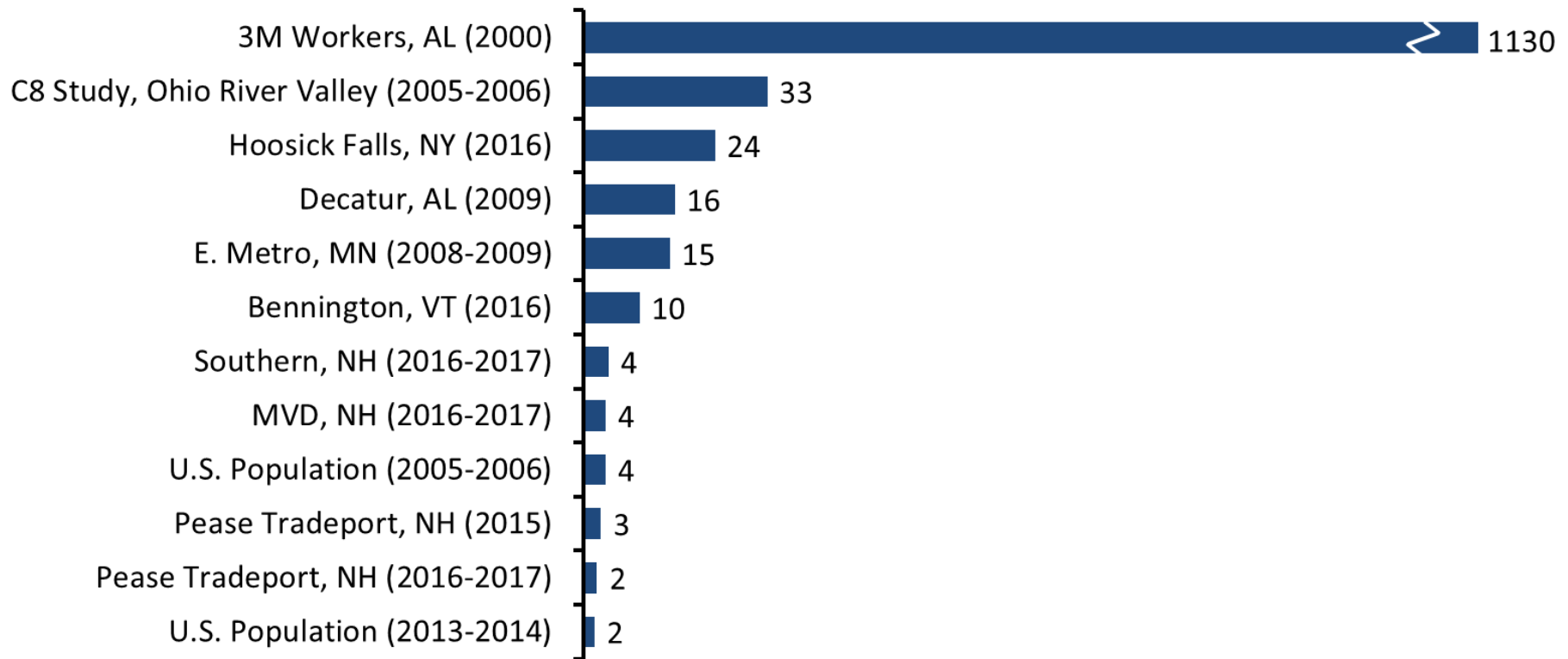


# # of People Tested by PFOA Blood Level



# Average PFOA Blood Levels Compared to Other Exposed Communities

Average PFOA Levels in Blood (Micrograms per Liter)



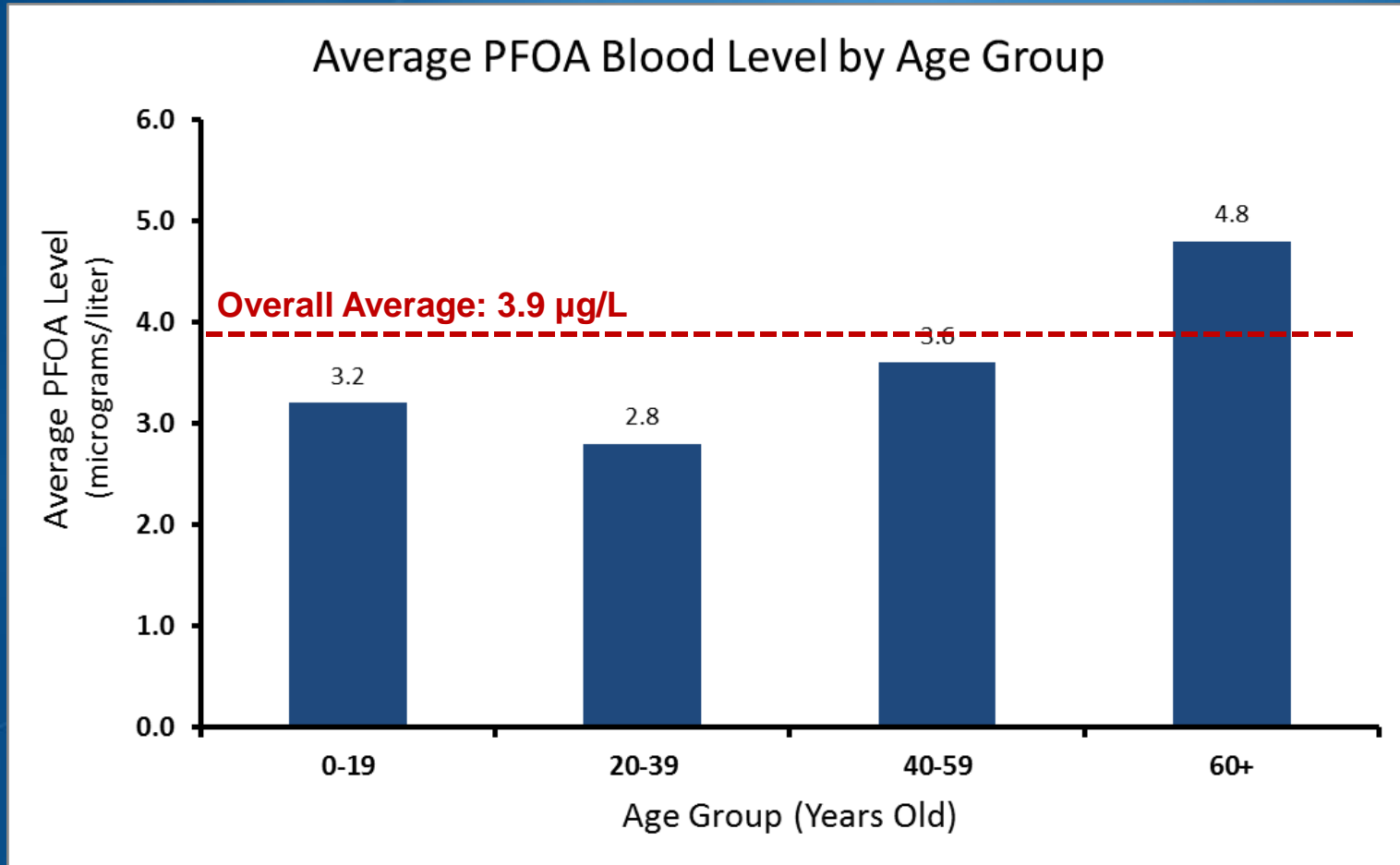
# Average PFOA levels by Age and Gender

- There was not a difference in PFOA blood levels by gender
- There was a difference in PFOA blood level by age -- increasing levels were seen with increasing age

	Number of People (n)	PFOA Serum Concentration Geometric Mean (µg/L)
<b>All Participants</b>	<b>217</b>	<b>3.9</b>
Males	107	4.1
Females	110	3.8
Ages 0 to 19	32	3.2
Ages 20 to 39	19	2.8
Ages 40 to 59	79	3.6
Ages 60+	87	4.8



# Average PFOA Level by Age Group



# Average PFOA levels by Residential History

- There is not a significant difference in PFOA blood levels when looking at residential history

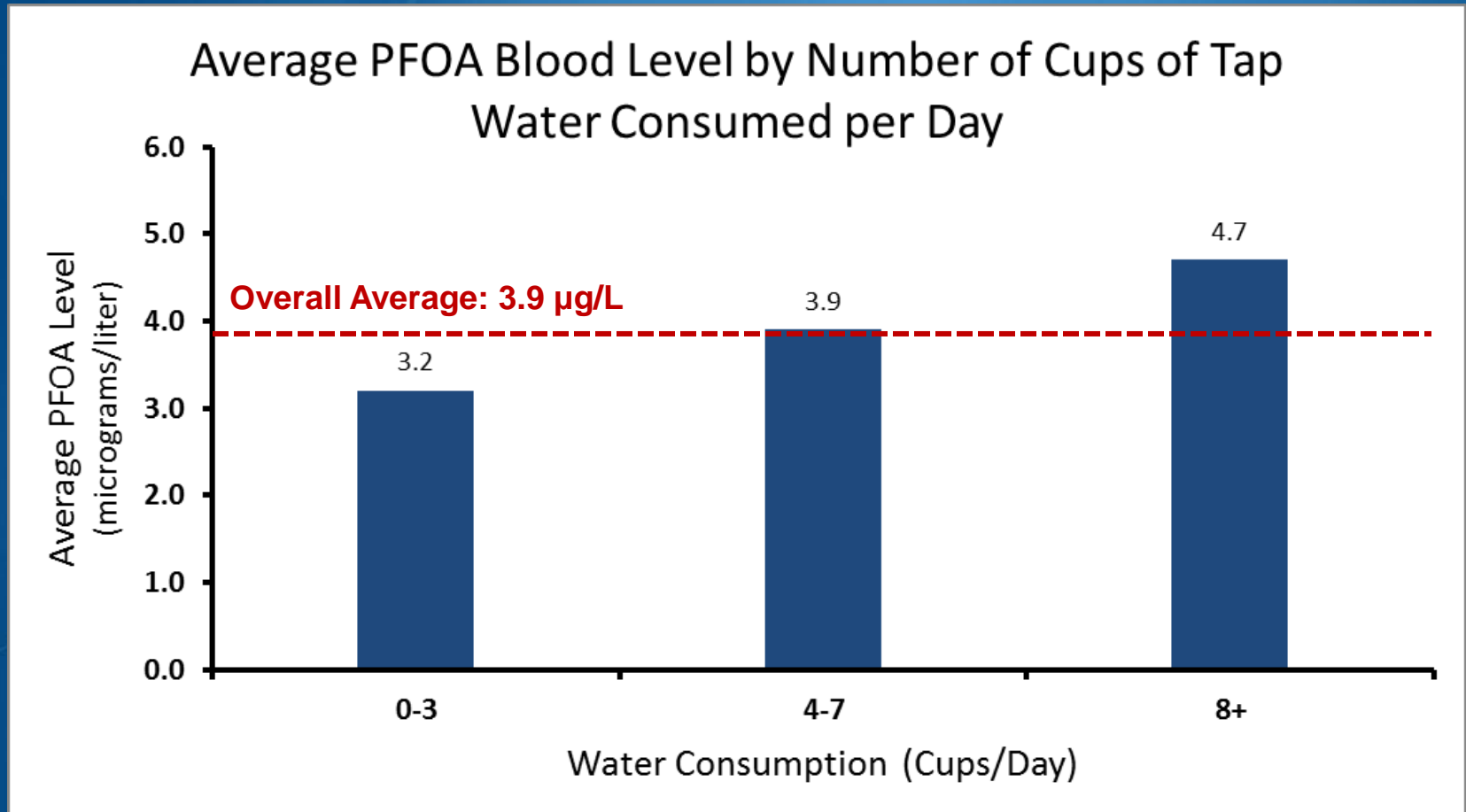
	Number of People (n)	PFOA Serum Concentration Geometric Mean (µg/L)
<b>All Participants</b>	<b>217</b>	<b>3.9</b>
Lived at residence < 10 years	38	3.7
Lived at residence ≥ 10 years	163	4.0

# Average PFOA levels by Water Consumption

- The average PFOA blood levels increased with increasing self-reported water consumption (cups per day)

	Number of People (n)	PFOA Serum Concentration Geometric Mean (µg/L)
<b>All Participants</b>	<b>217</b>	<b>3.9</b>
0 to 3 cups of tap water per day	54	3.2
4 to 7 cups of tap water per day	87	3.9
8 or more cups of tap water per day	70	4.7

# Average PFOA Blood Level by Amount of Water Consumed per Day



# PFOA Blood levels by Distance from Saint-Gobain and MVD Wells 4&5

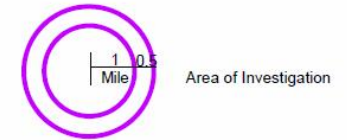
- Those living within 1 ½ miles of the Saint-Gobain plant had higher PFOA blood levels than those living more than 1 ½ miles away
- The effect of proximity to MVD Wells 4&5 on PFOA blood levels remains uncertain

Location	Number of People (n)	PFOA Serum Concentration Geometric Mean (µg/L)
All Participants	217	3.9
≤ 1.5 miles from Saint Gobain and Wells 4 & 5	13	6.3
≤ 1.5 miles from Wells 4 & 5 Only	21	3.7
≤ 1.5 miles from Saint Gobain Only	20	5.9
> 1.5 miles from Saint Gobain and Wells 4 & 5	161	3.6



# PFOA INVESTIGATION Updated: April 21, 2016

Results received through 04/20/2016



## PFOA (PPT)

- ≥400
- 100-399
- <100
- Non Detect (<2)
- Result Pending

## Public Water Supplies

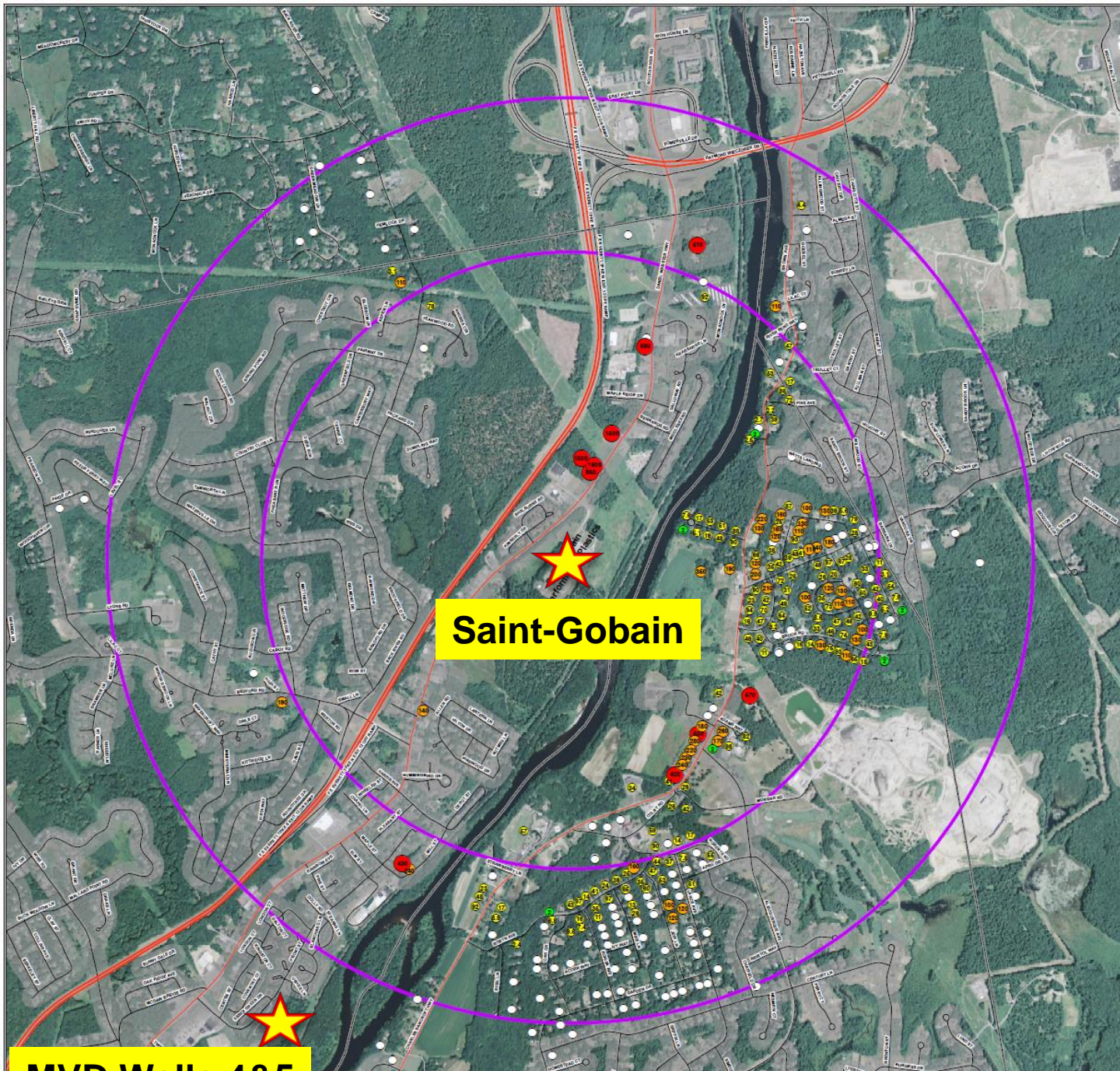
- Water Distribution

## Transportation

- US/ NH Route
- Road
- Driveway

- Political Boundary

1:7,800  
1 in = 650 feet



MVD Wells 4&5



# Summary

- Residents on the MVD public water system had higher levels of PFOA exposure compared to the general U.S. population
- Probably partly due to the levels of PFOA in the public water supply from MVD wells 4&5 (shut off), but cannot exclude other exposure sources
- PFOA blood levels were lower than levels seen in other PFOA exposed communities around the U.S. including in VT and NY
- PFOA blood levels still cannot tell a person if any health problems might occur or has occurred



# Next Steps

- We are working with DES to better understand the differences in PFOA exposure by location and distance from Saint-Gobain and MVD Wells 4&5
- The CDC's Agency for Toxic Substances and Disease Registry (ATSDR) is working on a "health consultation" for the exposed communities around Saint-Gobain
- We are working with federal partners and ATSDR to have a national health effects study conducted which includes our Southern NH and MVD communities

# Next Steps

- We are working with the NH Medical Society to improve communication with and education of NH healthcare providers about monitoring for potential health effects from exposure:
  - ATSDR Healthcare Provider Guidance:  
[https://www.atsdr.cdc.gov/pfc/docs/pfas\\_clinician\\_fact\\_sheet\\_508.pdf](https://www.atsdr.cdc.gov/pfc/docs/pfas_clinician_fact_sheet_508.pdf)
  - ATSDR Continuing Education for Clinicians:  
[https://www.atsdr.cdc.gov/emes/pfas\\_clinicians\\_training.html](https://www.atsdr.cdc.gov/emes/pfas_clinicians_training.html)

# Additional Resources

- NH DHHS PFC Website:  
<https://www.dhhs.nh.gov/dphs/pfcs/index.htm>
  - MVD Exposure Assessment summary
  - Overall (multiple community) summary
  - General informational brochure
- NH Data on other exposed communities:  
<https://wisdom.dhhs.nh.gov/wisdom/#main>
- ATSDR PFC (or PFAS) Website:  
<https://www.atsdr.cdc.gov/pfc/index.html>